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RHODE ISLAND'S RANK AMONG THE STATES

*Reprinted from the Seventy-Sixth Annual Report of
the Commissioner of Education*



STATE OF RHODE ISLAND
COMMISSIONER OF EDUCATION

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Rhode Island Education Circulars

Rhode Island's Rank Among the States

*Reprinted from the Seventy-Sixth Annual Report of
the Commissioner of Education*

Index numbers for state school systems, computed recently from statistics gathered by the United States Bureau of Education, indicate that Rhode Island has advanced from 39.27 in 1890 to 43.05 in 1900, to 50.84 in 1910, and 56.33 in 1918. Rhode Island statistics for 1918 give an index number of 61.09. In spite of what appears to be a record of substantial progress, the author of a volume published recently by the Russell Sage Foundation* estimates that Rhode Island holds twenty-sixth place among the fifty-two states and other territorial divisions of the United States, and that Rhode Island relatively has lost rank, going from fifth place in 1890 to sixth place in 1900, to tenth place in 1910, and to twenty-sixth place in 1918. Rhode Island statistics for 1918 would place Rhode Island in ninth position. An apparent loss of position in the face of substantial progress may be explained by greater progress elsewhere, but this explanation is not satisfactory. In view of the widespread publicity given to the findings of the author and to conclusions drawn therefrom hastily and sometimes without justification, and more particularly because there is so wide divergence between his figures and those determined by Rhode Island statistics, it seems desirable to discuss the measures used, the methods of computation employed, the basis on which measurements were taken, the reliability of the statistics as weighted by the author, the merit of the tests, and the validity of the conclusions drawn.

Index numbers for the states are estimated from ten sets of figures as follows: (1) percentage of school population attending school daily, (2) average days attended by each child of school age, (3) average number of days schools were kept open, (4) percentage that

*An Index Number for State School Systems. Leonard P. Ayres. New York: Russell Sage Foundation.

high school attendance was of total attendance, (5) percentage that boys were of girls in high schools, (6) average expenditure per child in average attendance, (7) average expenditure per child of school age, (8) average expenditure per teacher employed, (9) expenditure per pupil for purposes other than teachers' salaries, (10) expenditure per teacher employed for salaries. Essentially the sets of figures are concerned with two facts, and these are attendance and expenditure; ten tests or measurements are made from combinations of statistics of these two facts with other statistics. A brief discussion of the tests follows:

1. *The percentage of school population attending school daily.* The test in this instance rests upon the percentile relation of average daily attendance in public schools to school population, or children more than five and less than eighteen years of age. In determining index numbers for 1918 figures for school population were taken from the United States Census of 1910, and weighted by an estimated increase in population based on the experience of the ten years from 1900 to 1910. Completed state reports of the census of 1920 have demonstrated that rates of increase may vary widely in successive decades, and indicate the potential inaccuracy of estimates of the type made. Changes of population from 1910 to 1920 varied in the several states from sixty-three per cent increase down past zero to actual losses. It is significant, but not a matter for surprise, that the states that made the greatest relative gains in the author's tables in position in 1918 as compared with 1910 are among those that made the greatest gains in population in the ten years between 1910 and 1920, and that the three states that actually lost in population made substantial losses in positions established by index numbers. The reason appears in gains in enrollment vastly surpassing estimated gains in school population with the upper group, and the reverse relation in the lower group. The latter lost enrollment while assumed population increased according to estimate; when the census figures for 1920 were published it was seen that apparently retarded enrollment was correlated to decreasing population. The author was content to publish his book, however, in spite of so marked inconsistencies as enrollment exceeding school population in at least four instances; and these among those that took highest rank in his tabulations. If his statistics were accurate after being weighted, 123 children were enrolled in public schools in Montana for every 100 children resident in the state, 108 children were enrolled in public schools in Arizona for

every 100 children resident in the state, 108 children were enrolled in public schools in the District of Columbia for every 100 children resident in the district, and 106 children were enrolled in public schools in California for every 100 children resident in the state. One who would defend the use of such statistics must explain not only how more children could be enrolled than were resident, but also the whereabouts of children not attending school because released lawfully for employment in the years beyond compulsory school age, and of children not attending school in spite of compulsory attendance requirements. Under the most nearly perfect conditions of enforcement of law there is always at least a small number of the class last mentioned. The excess of enrollment over school population should have suggested at least a further consideration of the accuracy of estimated school population. It is true that the author used average daily attendance rather than enrollment as one factor in determining percentage rankings, but he used as the other factor an estimate of school population that was clearly questionable as to accuracy, because it was so inconsistent with school enrollment.

For Rhode Island the index number for per cent of average daily attendance in 1918 is 48.99, as determined by the author in the manner indicated above. The state school reports for the same year, based upon official returns of enrollment, attendance, and school population shown by the school census, give 52.55 per cent of average daily attendance in public schools. The variation of almost four per cent may be explained by the author's use of an estimated figure for school population, which was not as accurate as the figure returned from a school census taken for the year. Moreover, the author omitted altogether from his calculations enrollment in private and parochial schools, which in Rhode Island in 1918 was 18.4 per cent of total enrollment. Presuming a relatively similar ratio of average daily attendance to enrollment, the Rhode Island index figure for average daily attendance on school population should be 64.39. With this correction Rhode Island might rise from thirty-eighth to tenth position in the ranking of states by this test, the relative rise depending upon the actual effect of this omitted factor in other states. It seems certain that a large part of the greater progress in the west than in the east emphasized by the author would be discounted were credit given to the eastern states for average daily attendance on private instruction, which in a group of states along the eastern seaboard averages 20 per cent.

2. *Average days attended by each child of school age.*—For purposes of this test the total number of days of attendance in public schools is divided by school population, and the quotient is again divided by two. The second division is made “in order to make it comparable with percentage figures.” The same criticism of the use of estimated school population as one factor in the test may be made as in test one. The test is also subject to criticism because it omits days of attendance on private instruction, and counts children enrolled in private schools and parochial schools as part of school population. If the test be interpreted as indicating in days the actual provision of public school education made by the state for each child of school age, perhaps no further comment need be made. As the test in most instances, however, will be interpreted as indicating the number of days of schooling for each child of school age in the state it is permissible to point out the probability of error in this interpretation, by showing what the state's index number might be under the second interpretation.

The author gives 47.25 as Rhode Island's index number for school days per child of school population, calculated upon estimated school population. Official returns in Rhode Island School Reports give 50.71. If reasonable allowance for instruction in private and parochial schools were made, the index figure would be 62.14 if attendance on private instruction were counted, or 60.03 if enrollment in private and parochial schools were omitted in the count of school population.

3. *Average number of days schools were kept open.*—For purposes of this test the school year is divided by two, in order to reduce the index figure to the type of percentage figures. Rhode Island is credited with a school year of 193 days, whereas the credit should be 194 days, and the index number should be 97 instead of 96.50. Rhode Island has the longest average school year in the United States and ranks first in this test.

4. *Per cent high school attendance was of total attendance.*—This test assumes an essentially even age and grade distribution of pupils in a course of twelve grades, eight elementary and four secondary, and that in a perfectly organized system, which carried every boy and girl through the course, there would be two-thirds of enrollment in elementary schools, and one-third of enrollment in secondary schools. The index number is three times the percentage of high school enrollment to total enrollment, another adjustment made by

the author to weight his averages on a percentile basis. Both assumptions diverge widely from fact and experience. California, which holds highest rank in 1918, showed 19.6 per cent of pupils enrolled in high schools, contrasted with the $33\frac{1}{3}$ per cent assumed as perfect. The state holding lowest place had index number 10.28 which indicates 3.43 per cent. Rhode Island's index number was 34.48, or 11.49 per cent. As has been pointed out repeatedly in these reports, Rhode Island's largest educational loss appears in the years of school age beyond the years of compulsory school age. It is cause for serious consideration that so many of the young people of the state neglect or are deprived of opportunities for secondary education. There is at present urgent necessity for enlarged high school accommodations in four Rhode Island cities, but even more urgent necessity for the development of public sentiment strongly in favor of extension of high school education to a much larger percentage of our youth.

In this test figures are taken exclusively from public school records, and the test is not subject to the general criticism that it omits enrollment in private secondary schools. The author assumes that public high schools gain relatively from admitting pupils graduated from private and parochial elementary schools, and that this assumed gain tends to offset omission of the factor of private instruction in other tests. The assumption seems scarcely warranted in experience. The number actually transferring from private to public school at the period of graduation from elementary schools is known to be very small. In most instances, school education is completed with graduation from private elementary schools, or if continued, is continued in private secondary schools. This is true of parochial as well as of private schools.

5. *Per cent that boys were of girls in high schools.*—The author's only explanation of the significance of this test is: "This item is included in the final total at its face value. In general many more girls attend high school than do boys, but the proportion of boys is increasing. Its limit is taken as 100 per cent. *In the very few instances in which more boys have been recorded than girls, the per cent of girls to boys has been used.*" Surely it is a good rule that works both ways. The test is to be taken at its face value, which may be nothing at all.

6. *Average expenditure per child in average attendance.*—The index number is found by dividing total expenditures by the average num-

ber of children attending school. In criticism of this measurement it may be said that the factors of numbers to be educated and the size of schools are neglected. Comparisons of expenditures by Rhode Island towns on the basis of per capita of average attendance almost invariably show an advantage in lower cost in cities and compact or closely settled towns. Assuming employment of two teachers at \$1,200 annual salary, and average attendance of forty pupils in the school taught by one, and of twenty pupils in the school taught by the other, the per capita cost of instruction in the first school would be \$30; in the second school it would be \$60. In the ranking of towns by this test the second school would hold a higher position than the first; yet the quality of instruction measured by the teacher's salary would be the same in both instances. In the ranking of states by index numbers for 1918 it is to be noted that the western states, with comparatively small schools, rank higher generally than the eastern states. It is clear that this measure should be modified or weighted in some way by the introduction of the factor of size of school. If that were done, test eight, in which the index number is the total expenditure for schools divided by the number of teachers, might be omitted. Certainly a factor so significant in probable effect upon test six should not be used as the basis for another measurement.

7. *Average expenditure per child of school age.*—Here the index number is obtained by dividing total expenditure by school population. The author assumes that a state in which large numbers are educated in private schools is relieved of responsibility for these children and should be able, therefore, to expend a greater per capita for children enrolled in school. The total amount expended, therefore, should not vary for the same number of children, and in the general average the standing of the state will not be affected by the number enrolled for private instruction if it is doing its entire duty by the children enrolled in public schools. The assumption will not appeal to an educator who has had experience in the administration of schools. The people, while generous in taxing themselves for the support of public education, do not encourage extravagance. The acid test of school efficiency is not the amount of expenditures so much as the return upon the expenditure. It is still true that the people can afford to make larger investments in public education, and that improvement in schools may be accomplished in most instances by larger expenditures. But when expenditures

for education are increased, it should be demonstrated that the increased expenditure has been productive of improvement. That is to say, another test should follow the test of expenditure to determine the value of the increased expenditure. There is a large number of tests of efficiency that might be applied, including the preparation of the teacher, the quality of instruction, the percentage of graduations on total enrollment, the percentage of promotions, the sanitary conditions of buildings, etc., etc.

For Rhode Island and other states in which a considerable proportion of children are educated in private schools, a fairer test would be based upon school population diminished by the number of children enrolled for private instruction, for whom no public provision actually is made. Rhode Island's index number would be 33.64 instead of 27.45, were the measurement taken by the method suggested.

8. *Average expenditure per teacher employed.*—The test is essentially a measurement of the average expenditure per school, but varies from a true measurement on this basis because the total number of teachers is used instead of the average number of teachers or the number of schools. Rhode Island's position of twelfth by this test is not low; it is not possible with data available to estimate a change in position to be determined by the number of schools instead of the number of teachers. But the difference may be computed approximately on the basis of the average number of teachers. It is noticeable that the eastern states relatively hold higher positions in this test than do the western states. Rhode Island's index number on the base of the average number of teachers would be 62.68, instead of 57.50, as given by the author.

9. *Expenditure for other purposes than teachers' salaries.*—Total expenditure for other purposes than teachers' salaries is divided by the number of children in average daily attendance and multiplied by two. The multiplication, of course, emphasizes the advantage of a large quotient by the division, and while it has no effect on standings by this test, does affect standings in the combination of tests. The author assigns no reason for this particular test. It may be suggested that there is as good reason for dividing this expenditure by the number of schools, or the average number of teachers, as by the number of children in average daily attendance. As a matter of fact, the author in his test divides other expenditures by the number of children receiving instruction, and in the next test the amount

expended for teachers' salaries by the number of teachers, without giving any valid reason for the difference and distinction.

10. *Expenditure per teacher employed for salaries.*—This test essentially ranks the states on the basis of monthly salaries, for the total amount expended for salaries is divided by twelve times the total number of teachers. The essential error of an averaging of salaries on the base of the total number of teachers was discussed in the Commissioner's report for 1919. The teacher's salary is properly averaged on the base of the number of teaching positions. If, for instance, six schools are conducted, and \$1,200 is paid for each school as salary for the teacher, the average salary would be \$100 per month on the whole year basis, if there were no changes during the year. Were there one instance in which a teacher died or resigned and was replaced, the total number of teachers would be seven, and the average monthly salary based on the total number of teachers would be \$85.71. If two teachers were replaced the average would be \$75. *Yet the salary paid for the position has remained constant.* The error is clear. For 1918 by his method, the author computes the average teacher's salary in Rhode Island at \$736.08. On the base of the average number of teachers employed it was \$801.65, which would give an index number of \$66.80 instead of \$61.34.

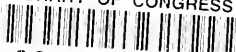
The following table presents for comparison the index mark in the ten tests as computed by the author, and the index number corrected as indicated:

	Author	Corrected
Test 1, attendance	48.99	64.39
Test 2, days attended	47.25	62.14
Test 3, length of school year	96.50	97.00
Test 4, high school attendance on elementary school attendance	34.48	34.48
Test 5, boys to girls in high schools	81.43	81.43
Test 6, average expenditure per average attend- ance	56.03	56.03
Test 7, average expenditure per child of school age	27.45	33.64
Test 8, average expenditure per teacher	57.50	62.68
Test 9, expenditure per pupil for miscellaneous purposes	52.29	52.29
Test 10, teachers' salaries	61.34	66.80
Index for all tests	56.33	61.09

An index number of 61.09 for all tests would carry Rhode Island from twenty-sixth into ninth place, assuming that all other states retained the index numbers assigned by the author. There would, however, be changes in the positions of other states, including a general improvement for eastern states, and a corresponding loss for western states, the relative change depending very largely upon the inaccuracy of the estimates of school population used by the author and the percentage of school population receiving private instruction. It is probable that in the process of change Rhode Island's position would be higher rather than lower than ninth, assuming that the western states at the top were removed to lower positions, and that eastern states made relatively similar gains to those made by Rhode Island and simply advanced in the order established in the author's table, subject to slight variation in the order depending upon the relative and variable effects of the factors indicated.

Whatever opinion may be held as to the desirability of eliminating private instruction, and enforcing attendance upon public instruction exclusively, it appears reasonable that school systems should be measured as they are under the laws of the state for the time being, and that measurements based upon an assumed standard otherwise should be reasonably discounted. In this connection it is interesting to record that there has been a widespread criticism of the index numbers as published, and that the official publication of the Bureau of Education has declared that the measurements are not to be interpreted as reasonably accurate because of the neglected factor of variation in the growth of population. It would have been better had the author withheld his book until the census of 1920 had been completed, and a basis given for a comparison upon the census; and it would be fairer to measure all state systems with reasonable consideration for the effect of private school attendance upon enrollment and attendance. The author's study unquestionably has awakened a fresh interest in the improvement of state school systems. Rhode Island schools may profit by criticism, even if the criticism is not wholly merited, because criticism sometimes stimulates measures for improvement.

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